IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Takahiro Fujimori et al.

Serial No.:   Continuation of 08/943,611

Filed: herewith

For: DATA COMMUNICATION METHOD, ELECTRONIC APPARATUS,
                AND PHYSICAL-LAYER-CONTROL INTEGRATED CIRCUIT

Examiner: John Pezzlo (parent application)

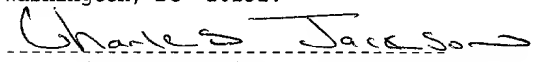Art Unit: 2662 (parent application)

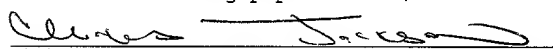745 Fifth Avenue
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PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

             Prior to examining the above-referenced Continuation application on the merits,

please enter the following amendment:

IN THE SPECIFICATION:

Please replace the paragraph beginning at page 6, line 6, with the following rewritten paragraph:

--Figs. 5A and 5B are diagrams showing a method for realizing a Tp bias when a 1394 cable is used and an example of a method for realizing a Tp bias according to the present invention, respectively.--

Please replace the paragraph beginning at page 8, line 10, with the following rewritten paragraph:

--Next, a method for transmitting data rates in the 1394 communication will be described. As shown in Figs. 2A to 2C, according to the 1394 standard, data rates of S100, S200 and S400 are transmitted by setting the levels of TpB and TpB*, as bias signals which flow in the cable for transmitting the strobe signal, to mutually different predetermined levels during e.g., 100 to 120 nanoseconds.--

Please replace the paragraph beginning at page 8, line 17, with the following rewritten paragraph:

--In addition, according to the 1394 communication using the optical-fiber cable, of the present invention, the UTP cable or the STP cable, the data rates are transmitted based on the number of times certain control symbols are sent. Fig. 4 shows a table of symbols used in the present invention. In the 1394 communication using the optical-fiber cable, the UTP cable or the STP cable, data of the 1394 communication is transmitted by 4B/5B codes. The 4B/5B codes are a coding method standard used in digital data communication, and are also used in 100-Mbps

gs0302

Ethernet, FDDI and so forth. Each symbol employed as a code has a different use depending on the communication method using the symbol. In any event, aside from the 4B/5B coding method, there are other types of coding methods, which will be described below.--

Please replace the paragraph beginning at page 9, line 6, with the following rewritten paragraph:

--The 4B/5B codes have sixteen types of control symbols. The symbol "JK" is transmitted to the prefix area of a 1394 packet, and for example, the symbol "S" is used for notification of the data rate. At this time the data rate is transmitted based on the number of times that the symbol "S" is inserted (sent) in the prefix area of the 1394 packet. For instance, as shown in Fig. 3, no insertion of the symbol "S" means S100, the insertion of one "S" means S200, and the insertion of two "S"s means S400. Even if a faster data rate is added to the 1394 standard in the future, this method is capable of coping with such a case by increasing the number of times the symbol "S" is inserted. Instead of the recognition with the umber of times for sending the symbol "S", the case of sending another predetermined symbol, e.g., the symbol "R" may be recognized as S400.--

Please replace the paragraph beginning at page 9, line 21, with the following rewritten paragraph:

--Although the number of the symbols "JK" in the prefix region differs depending on each data rate, it is preferable to insert the symbol "S" used for notification of the data rate in the first half as long as circumstances permit. This is because it is preferable that data-rate

3   gs0302

information be recognized as early as possible. The symbol "JK" must be initially sent. The

reason is that symbol synchronization needs to be performed as described above.--

Please replace the paragraph beginning at page 12, line 17, with the following rewritten

paragraph:

--A physical-layer control LSI 41 shown in Fig. 6 is adapted for the UTP or STP

cable. The physical-layer control LSI 41 is provided with a port 14 to which a socket 2 of a 1394

cable 5 is connected, and a port 18 to which a connector 3 of a UTP or STP cable (hereinafter

referred to as "UTP/STP cable") is connected. The physical-layer control LSI 41 includes

circuits for performing the 1394 standard process, and circuits for performing a process for the

above-described UTP or STP transmission, which correspond to the two ports 14 and

18.--

Please replace the paragraph beginning at page 13, line 2, with the following rewritten paragraph:

--In the physical-layer control LSI 41 there is provided a 1394 physical-layer

protocol logic 11. The 1394 physical-layer protocol logic 11 executes bus initializing,

arbitration, and the various processes described with reference to Figs. 1A-1D to Figs. 5A and

5B.--

Please replace the paragraph beginning at page 13, line 16, with the following rewritten

gs0302

paragraph:

--A 4B/5B conversion circuit 15 for performing the 4B/5B conversion of the

sending data and the 5B/4B conversion of the received data is also connected to the 1394

physical-layer protocol logic 11. An MLT-3 circuit 16 for performing the MLT (multilevel

transmission)-3 coding of the sending data and the MLT-3 reverse conversion of the received

data is connected to the 4B/5B conversion circuit 15, and an analog circuit 17 for performing the

adjustment of sending/received-signal level and so forth is connected thereto. The analog circuit

17 is connected to the port 18, and the UTP/STP connector 3 is connected to the port 18 via an

insulating transformer 4. The MLT-3 circuit 16 performs voltage-level conversion based on

three-valued logic, and gives a level change when bit "1" is input. The physical-layer control LSI

41 may consist of a single integrated circuit. However, a portion shown by a dotted line in Fig. 6

may consist of another integrated circuit. Practically, it is possible to build the insulating

transformer 4 into the UTP/STP connector 3.--

Please replace the paragraph beginning at page 15, line 3, with the following rewritten paragraph:

--A physical-layer control LSI 51 shown in Fig. 8 is adapted for the UTP or STP

cable, and the POF cable. The physical-layer control LSI 51 is provided with a port 14 to which

a socket 2 of a 1394 cable is connected, and a port 21 to which both the UTP or STP cable and

the POF cable are connected. The physical-layer control LSI 51 includes an MLT-3 circuit 16

used for connection to the UTP or STP cable, and an NRZI coding circuit 20 used for connection

gs0302

to the POF cable, and further includes a connector detector 22 for detecting the type of connector connected to the port 21, and first and second switches SW1 and SW2 which are controlled by the output of the connector detector 22. When the UTP or STP cable is connected to the port 21, both the first and second switches SW1 and SW2 are switched to the MLT-3 circuit 16. When the POF cable is connected to the port 21, both the first and second switches SW1 and SW2 are switched to the NRZI coding circuit 20.--

Please replace the paragraph beginning at page 15, line 20, with the following rewritten paragraph:

--The physical-layer control LSIs 41, 31 and 51 according to the present invention have the foregoing structures. Thus, when the 1394 socket 2 is connected to the port 14, the ON condition of the bias signal is transmitted by fixing TpA and TpA* at the high level as shown in Fig. 5A, and the data rate is transmitted based on the levels of TpB and TpB* as shown in Figs. 2A to 2C.--

IN THE CLAIMS:

Please cancel Claims 1-14.

Please add the following Claims 15-41:

--15. A data communication method comprising the steps of:

connecting a plurality of electronic devices provided with a communication interface

gs0302

based on the IEEE 1394 standard by at least one type of cable selected from the group consisting

of an optical-fiber cable, an unshielded-twisted pair (UTP) cable and a stand-alone cable

comprising only one shielded-twisted pair (STP) cable;

allocating periodic bit regions which are not used at a low data rate to transfer data in a

data packet to be transmitted, on a data stream by transmitting data bits at said low data rate only

in predetermined portions of periodic intervals of said data stream, without transmitting any data

during the allocated periodic bit regions, so as to facilitate a change in data communication to

communication at higher data rates defined by the IEEE 1394 standard; and,

communicating data between said electronic devices.--

--16. The method of Claim 15, further comprising the step of transmitting data rates by

sending at least one type of predetermined speed-control symbol via a data stream.--

--17. A data communication method in a data communication system with a variable data

rate and having an interface to perform data communication among a plurality of electronic

apparatuses, wherein a cable defined in said data-communication system is normally used in said

data communication system, said method comprising the steps of:

communicating data using an arrangement of bits corresponding to a maximum

data rate, when a communication channel for performing data communication among said

plurality of electronic apparatuses using a multi-purpose cable different from said cable defined

gs0302

in said data-communication system is used; and

allocating on a data stream periodic bit regions not used to transfer data in a data packet when said multi-purpose cable is used to perform the data communication at a low data rate, by transmitting data bits at said low data rate only in predetermined portions of periodic intervals of said data stream, without transmitting any data during the allocated periodic bit regions, so as to facilitate a change in data communication to higher data rate communication.--

--18. The method of Claim 17, further comprising the step of sending one or more types of predetermined speed control symbols by means of said data stream in order to transmit said data rates.--

--19. The method of Claim 17, further comprising the step of providing a bias effect, defined in said data-communication system, to said cable by transmitting a predetermined control symbol on said multi-purpose cable, said bias effect used to detect one of said apparatuses connected to another of said apparatuses.--

--20. The method of Claim 19, further comprising the step of sending, when said predetermined control symbol has a relatively strong signal change, a control symbol with small signal change to weaken unnecessary radiation.--

gs0302

--21. A data communication method comprising the steps of:

connecting a plurality of electronic devices provided with a communication interface based on the IEEE 1394 standard by at least one type of cable selected from the group consisting of an optical-fiber cable, an unshielded-twisted pair (UTP) cable and a stand-alone cable comprising only one shielded-twisted pair (STP) cable;

providing a Tp bias effect on said at least one type of cable by transmitting predetermined symbols thereon, said Tp bias effect being used to detect one of said devices being connected to another of said devices.--

--22. The method of Claim 21, wherein said Tp bias effect is provided by transmitting a continuous stream of predetermined symbols to represent a condition of Tp bias being on.--

--23. The method of Claim 21, wherein the predetermined control symbols exhibit small signal change in order to limit unnecessary radiation in said UTP or said STP cables.--

--24. An electronic apparatus adapted to transmit and receive data over a serial data bus, said apparatus comprising:

a first terminal operably connectable to an IEEE 1394 serial bus cable having two twisted pairs;

a second terminal operably connectable to a multi-purpose cable for use as at least part of

said serial data bus when operably connected to said second terminal, said multi-purpose cable

selected from the group consisting of an optical-fiber cable, an unshielded-twisted pair (UTP)

cable, and a stand-alone cable comprising only one shielded-twisted pair (STP) cable;

an IEEE 1394 physical-layer protocol logic section operative to perform serial data bus

initialization and arbitration;

a first conversion section connected between said logic section and said first terminal to

convert signals transmitted and received between said serial bus cable and said logic section; and

a second conversion section connected between said second terminal and said logic

section to convert signals transmitted and received to and from said logic section and said

optical-fiber, UTP or stand-alone cable.--

--25. The electronic apparatus of Claim 24 wherein,

said second terminal is operably connectable to said multi-purpose cable selected from

the group consisting of said UTP cable and said stand-alone cable;

said first conversion section comprises a DS coding section and a first signal level

adjustment section; and

said second conversion section comprises a code conversion section, a multilevel

transmission –3 (MLT-3) section for performing MLT-3 coding of data to be transmitted on said

UTP cable or stand-alone cable, and for performing MLT-3 reverse conversion of data received

from said UTP or stand-alone cable, and a second signal level adjustment section.--

gs0302

--26. The electronic apparatus of Claim 25, wherein said code conversion section is a m bit to n bit conversion section for performing m bit to n bit conversion of data to be transmitted from said apparatus on said UTP or stand-alone cable and n bit to m bit conversion of data received by said apparatus from said UTP or stand-alone cable.--

--27. The electronic apparatus of Claim 24 wherein,

said multi-purpose cable is said fiber optic cable, and said second terminal operably connects to said optical-fiber cable via an electro-optical converter;

said first conversion section comprises a DS coding section and a first signal level adjustment section; and

said second conversion section comprises a code conversion section, a NRZI coding section and a second signal level adjustment section.--

--28. The electronic apparatus of Claim 27, wherein said code conversion section is a m bit to n bit conversion section for performing m bit to n bit conversion of data to be transmitted from said apparatus on said optical-fiber cable and n bit to m bit conversion of data received by said apparatus from said optical-fiber cable.--

--29. The electronic apparatus of Claim 24 wherein,

gs0302

said first conversion section comprises a DS coding section and a first signal level

adjustment section;

said second conversion section comprises:

a code conversion section connected to said logic section;

a multilevel transmission –3 (MLT-3) section for performing MLT-3 coding of data to be

transmitted on said UTP cable or stand-alone cable, and for performing MLT-3 reverse

conversion of data received from said UTP or stand-alone cable, and a second level adjustment

section;

a NRZI coding section for coding data transmitted on and received from said optical-fiber

cable; and

switching means for switching to said NRZI section when said optical-fiber cable is

operably connected to said second terminal and to said MLT-3 section when said UTP or stand-

alone cable is operably connected to said second terminal.--

--30. The electronic apparatus of Claim 29, further comprising a connector detector for

detecting the type of connector connected to said second terminal, said connector detector

controlling switching states of said switching means based on the connector type detected.--

--31. The electronic apparatus of Claim 24, wherein connection of said second terminal to

said UTP or stand-alone cable is made through an insulating transformer, and connection of said

second terminal to said optical-fiber cable is made through an electro-optical converter.--

--32. An electronic apparatus adapted to transmit and receive data over a serial data bus, said apparatus comprising:

a first terminal operably connectable to a serial bus cable having two twisted pairs;

a second terminal operably connectable to a multi-purpose cable for use as at least part of said serial data bus when operably connected to said second terminal, said multi-purpose cable selected from the group consisting of an optical-fiber cable, an unshielded-twisted pair (UTP) cable, and a stand-alone cable comprising only one shielded-twisted pair (STP) cable;

a physical-layer protocol logic section operative to perform serial data bus initialization and arbitration;

a first conversion section connected between said logic section and said first terminal to convert signals transmitted and received between said serial bus cable and said logic section; and

a second conversion section connected between said second terminal and said logic section to convert signals transmitted and received to and from said logic section and said optical-fiber, UTP or stand-alone cable.--

--33. The electronic apparatus of Claim 32 wherein,

said second terminal is operably connectable to said multi-purpose cable selected from the group consisting of said UTP cable and said stand-alone cable;

gs0302

said first conversion section comprises a DS coding section and a first signal level adjustment section; and

said second conversion section comprises a code conversion section, a multilevel transmission –3 (MLT-3) section for performing MLT-3 coding of data to be transmitted on said UTP cable or stand-alone cable, and for performing MLT-3 reverse conversion of data received from said UTP or stand-alone cable, and a second signal level adjustment section.--

--34. The electronic apparatus of Claim 33, wherein said code conversion section is a m bit to n bit conversion section for performing m bit to n bit conversion of data to be transmitted from said apparatus on said UTP or stand-alone cable and n bit to m bit conversion of data received by said apparatus from said UTP or stand-alone cable.--

--35. The electronic apparatus of Claim 32 wherein,

said multi-purpose cable is said optical-fiber cable, and said second terminal is operably connectable to said optical-fiber cable via an electro-optical converter;

said first conversion section comprises a DS coding section and a first signal level adjustment section; and

said second conversion section comprises a code conversion section, a NRZI coding section and a second signal level adjustment section.--

gs0302

--36. The electronic apparatus of Claim 35, wherein said code conversion section is a m bit to n bit conversion section for performing m bit to n bit conversion of data to be transmitted from said apparatus on said optical-fiber cable and n bit to m bit conversion of data received by said apparatus from said optical-fiber cable.--

--37. The electronic apparatus of Claim 32 wherein,

said first conversion section comprises a DS coding section and a first signal level adjustment section;

said second conversion section comprises:

a code conversion section connected to said logic section;

a multilevel transmission –3 (MLT-3) section for performing MLT-3 coding of data to be transmitted on said UTP cable or stand-alone cable, and for performing MLT-3 reverse conversion of data received from said UTP or stand-alone cable, and a second level adjustment section;

a NRZI coding section for coding data transmitted on and received from said optical-fiber cable; and

switching means for switching to NRZI section when said optical-fiber cable is connected to said second terminal and said MLT-3 section when said UTP or stand-alone cable is connected to said second terminal.--

gs0302

--38. The electronic apparatus of Claim 29, further comprising a connector detector for detecting the type of connector connected to said second terminal, said connector detector controlling switching states of said switching means based on the connector type detected.--

--39. The electronic apparatus of Claim 32, wherein connection of said second terminal to said UTP or stand-alone cable is made through an insulating transformer, and connection of said second terminal to said optical-fiber cable is made through an electro-optical converter.--

--40. An integrated circuit formed in a physical layer based on an interface adapted for a serial data bus data-communication system that has a variable data rate, wherein said integrated circuit comprises:

a first terminal operably connectable to a serial bus cable having two twisted pairs;

a second terminal operably connectable to a multi-purpose cable for use as at least part of said serial data bus when operably connected to said second terminal, said multi-purpose cable selected from the group consisting of an optical-fiber cable, a UTP cable and a stand-alone cable comprising only one STP cable;

a physical-layer protocol logic section operative to perform serial data bus initialization and arbitration;

a first conversion section connected between said logic section and said first terminal to convert signals transmitted and received between said serial bus cable and said logic section; and

gs0302

a second conversion section connected between said second terminal and said logic

section to convert signals transmitted and received to and from said logic section and said

optical-fiber, UTP or stand-alone cable.--

--41. The integrated circuit of Claim 40, wherein said serial data bus data-communication

system is a system in accordance with the IEEE 1394 high speed serial bus standard, said serial

bus cable is an IEEE 1394 cable, and said physical-layer protocol logic section is an IEEE 1394

physical-layer protocol logic section.--

REMARKS

This preliminary amendment replaces original Claims 1-14 with new Claims 15-41. All

claims as presented herein are believed patentably distinguishable from the prior art of record in

the parent of this application (S/N 08/943,611), for which a Notice of Allowance has been issued.

The present amendment also amends the specification to correct typographical and grammatical

errors. Note that a proposed drawing change is attached hereto to correct inadvertent errors as

was done in the parent application.

New independent Claim 15 is similar in scope to Claim 2 of the parent application as it

stood prior to the Final Office Action of July 19, 2000. In that Office Action, Claim 2 was

rejected under 35 U.S.C. 103(a) over U.S. Patent No. 5,808,660 ("Sekine") in view of U.S.

Patent No. 5,784,648 ("Duckwall"). The Examiner reasoned that Sekine discloses a system that

gs0302

transmits data per the 1394 standard that supports three data rates which can be selected, and that

video data is transmitted to different passengers in time divisions. Apparently, the Examiner had

concluded that in the Sekine system, data could be transmitted in one time slot in the TDM

system at a slow speed and in another time slot at a high speed.

New Claim 15, however, recites the following:

" ...allocating periodic bit regions which are not used at a low data rate to transfer data in
a data packet to be transmitted, on a data stream by transmitting data bits at said low data
rate only in predetermined portions of periodic intervals of said data stream, *without
transmitting any data during the allocated periodic bit regions*, so as to facilitate a
change in data communication to communication at higher data rates defined by the IEEE
1394 standard." (emphasis added)

By way of example only to explain some of the principles of Claim 15, reference is made

to FIGS. 1A to 1D of the application where it is seen that data is transmitted at a low speed in

FIG. 1B in the non-shaded time slots, while no data is transmitted in the shaded regions of FIG.

1B. Thus, the shaded regions are examples of allocated periodic bit regions which are not used at

a low data rate to transmit data. It is readily apparent that this type of bit region allocation is

neither taught nor suggested by Sekine.

The Sekine system does not disclose or suggest the above-quoted aspects of the present

invention. As best understood by the Applicants' representative, when the Sekine system

operates in the TDM mode, only one user has control of the bus for the duration of a

predetermined length bit steam. That is, the bus control would not change hands on a bit by bit or

a byte by byte basis: instead, it is believed that each user would control the bus for a relatively

long time interval. Now, if one user communicated at slow speeds during one portion of the periodic TDM interval and another user communicated at higher speeds during another portion of the interval, this technique would not be equivalent to the above-quoted aspect of the Applicants' invention. That is, Sekine does not teach or suggest transmitting data bits at a low data rate only in predetermined portions of periodic intervals of the data stream, *without transmitting any data during the allocated periodic bit regions* (i.e., in Sekine's case, during the periodic time intervals presumably allocated for high speed data transmission).

Duckwell was relied upon for teaching the use of a UTP cable, and does not cure the deficiencies of Sekine with respect to Claim 15.

Accordingly, new Claim 15 and the claims depending therefrom are patentable over any proper combination of Sekine and Duckwell. New independent Claim 20 and its dependent claims are patentable over these references for analogous reasons.

New independent Claims 21, 24, 32 and 40 recite novel features not previously presented in the parent of this application. Each of these claims, as well as the claims depending therefrom, are believed to be patentable over the prior art of record.

Conclusion

In view of the foregoing, entry of this amendment, and the allowance of this application with Claims 15-41 are respectfully requested.

The above statements concerning the disclosure in the cited references represent the
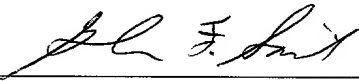
present opinion of Applicants' representative and, in the event that the Examiner disagrees,

Applicants' representative respectfully requests the Examiner to specifically indicate those

portions of the respective references providing the basis for a contrary view.

Attached hereto is a marked-up version of the changes made to the specification and

claims by the current amendment. The attached page is captioned "Version With Markings to

Show Changes Made."

In the event that additional cooperation in this case may be helpful to complete its

prosecution, the Examiner is cordially invited to contact Applicants' representative at the

telephone number written below.

<div align="center">
Respectfully submitted,

FROMMER LAWRENCE & HAUG LLP
Attorneys for Applicants

By _____

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Reg. No. 37,437
(212) 588-0800
</div>

gs0302

Version With Markings to Show Changes Made

In the Specification:

The paragraph beginning at page 6, line 6, has been amended as follows:

--Figs. 5A and 5B are [charts] <u>diagrams</u> showing a method for realizing a Tp bias

when [an] <u>a</u> 1394 cable is used and an example of a method for realizing a Tp bias according to

the present invention<u>, respectively</u>.--

The paragraph beginning at page 8, line 10, has been amended as follows:

--Next, a method for transmitting data rates in the 1394 communication will be

described. As shown in Figs. 2A to 2C, according to the 1394 [cable] <u>standard</u>, data rates of

S100, S200 and S400 are transmitted by setting the levels of TpB and TpB*, as bias signals

which flow in the cable for transmitting the strobe signal, to mutually different predetermined

levels during e.g., 100 to 120 nanoseconds.--

The paragraph beginning at page 8, line 17, has been amended as follows:

--In addition, according to the 1394 communication using the optical-fiber cable,

of the present invention, the UTP cable or the STP cable, the data rates are transmitted based on

the number of times [for sending the control systems] <u>certain control symbols are sent</u>. Fig. 4

shows a table of symbols used in the present invention. In the 1394 communication using the

gs0302

optical-fiber cable, the UTP cable or the STP cable, data of the 1394 communication is

transmitted by 4B/5B codes. The 4B/5B codes are a coding method standard used in digital data

communication, and are also used in 100-Mbps Ethernet, FDDI and so forth. Each symbol

employed as a code has a different use depending on the communication method using the

symbol. [Differently from this one, there are many] In any event, aside from the 4B/5B coding

method, there are other types of coding methods, which will be described below.--

The paragraph beginning at page 9, line 6, has been amended as follows:

--The 4B/5B codes have sixteen types of control symbols. The symbol "JK" is

transmitted to the prefix area of a 1394 packet, and for example, the symbol "S" is used for

notification of the data rate. At this time the data rate is transmitted based on the number of

times [for sending] that the symbol "S" [to] is inserted (sent) in the prefix area of the 1394

packet. For instance, as shown in Fig. 3, no [sending] insertion of the symbol "S" means S100,

the [sending once] insertion of one "S" means S200, [and the sending] and the insertion of two

"S"s [twice] means S400. Even if a faster data rate is added to the 1394 standard in the future,

this method is capable of coping with such a case by increasing the number of times [for sending

the symbol "S"] the symbol "S" is inserted. Instead of the recognition with the umber of times

for sending the symbol "S", the case of sending another predetermined symbol, e.g., the symbol

"R" may be recognized as S400.--

gs0302

The paragraph beginning at page 9, line 21, has been amended as follows:

--Although the number of the symbols "JK" in the prefix region differs depending on each data rate, it is preferable to insert the symbol "S" used for notification of the data rate in the first half as [so] long as circumstances permit. This is because it is preferable that data-rate information be recognized as early as possible. The symbol "JK" must be initially sent. The reason is that symbol synchronization needs to be performed as described above.--

The paragraph beginning at page 12, line 17, has been amended as follows:

--A physical-layer control LSI [1] 41 shown in Fig. 6 is adapted for the UTP or STP cable. The physical-layer control LSI [1] 41 is provided with a port 14 to which a socket 2 of a 1394 cable 5 is connected, and a port 18 to which a connector 3 of a UTP or STP cable (hereinafter referred to as "UTP/STP cable") is connected. The physical-layer control LSI [1] 41 includes circuits for performing the 1394 standard process, and circuits for performing a process for the above-described UTP or STP transmission, which correspond to the two ports 14 and 18.--

The paragraph beginning at page 13, line 2, has been amended as follows:

--In the physical-layer control LSI [1] 41 there is provided a 1394 physical-layer protocol logic 11. The 1394 physical-layer protocol logic 11 executes bus initializing, arbitration, and the various processes described with reference to Figs. 1A-1D to Figs. 5A and

5B.--

The paragraph beginning at page 13, line 16, has been amended as follows:

--A 4B/5B conversion circuit 15 for performing the 4B/5B conversion of the

sending data and the 5B/4B conversion of the received data is also connected to the 1394

physical-layer protocol logic 11. An MLT-3 circuit 16 for performing the MLT (multilevel

transmission)-3 coding of the sending data and the MLT-3 reverse conversion of the received

data is connected to the 4B/5B conversion circuit 15, and an analog circuit 17 for performing the

adjustment of sending/received-signal level and so forth is connected thereto. The analog circuit

17 is connected to the port 18, and the UTP/STP connector 3 is connected to the port 18 via an

insulating transformer 4. The MLT-3 circuit 16 performs voltage-level conversion based on

three-valued logic, and gives a level change when bit "1" is input. The physical-layer control LSI

[1] 41 may consist of a single integrated circuit. However, a portion shown by a dotted line in

Fig. 6 may consist of another integrated circuit. Practically, it is possible to [built] build the

insulating transformer 4 into the UTP/STP connector 3.--

The paragraph beginning at page 15, line 3, has been amended as follows:

--A physical-layer control LSI [41] 51 shown in Fig. 8 is adapted for the UTP or

STP cable, and the POF cable. The physical-layer control LSI [41] 51 is provided with a port 14

to which a socket 2 of a 1394 cable is connected, and a port 21 to which both the UTP or STP

gs0302

cable and the POF cable are connected. The physical-layer control LSI [41] 51 includes an MLT-3 circuit 16 used for connection to the UTP or STP cable, and an NRZI coding circuit 20 used for connection to the POF cable, and further includes a connector detector 22 for [connecting] detecting the type of connector connected to the port 21, and first and second switches SW1 and SW2 which are controlled by the output of the connector detector 22. When the UTP or STP cable is connected to the port 21, both the first and second switches SW1 and SW2 are switched to the MLT-3 circuit 16. When the POF cable is connected to the port 21, both the first and second switches SW1 and SW2 are switched to the NRZI coding circuit 20.--

The paragraph beginning at page 15, line 20, has been amended as follows:

--The physical-layer control LSIs [1, 31 and 41] 41, 31 and 51 according to the present invention have the foregoing structures. Thus, when the 1394 socket 2 is connected to the port 14, the ON condition of the bias signal is transmitted by fixing TpA and TpA* at the high level as shown in Fig. 5A, and the data rate is transmitted based on the levels of TpB and TpB* as shown in Figs. 2A to 2C.--

In the Claims:

Claims 1-14 have been canceled and replaced by Claims 15-41.

gs0302

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Takahiro Fujimori et al.

Serial No.:   Continuation of 08/943,611

Filed: herewith

For: DATA COMMUNICATION METHOD, ELECTRONIC APPARATUS,
              AND PHYSICAL-LAYER-CONTROL INTEGRATED CIRCUIT

Examiner: John Pezzlo (parent application)

Art Unit: 2662 (parent application)

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REQUEST FOR APPROVAL OF DRAWING CHANGES

Assistant Commissioner for Patents
Washington, D.C. 20231

Attention: Official Draftsperson

Sir:

        In the above-identified patent application, the Examiner's approval for the

following drawing corrections is requested:

PAD8846

FIG. 6: In block 3, change "LR" to --OR--;

FIG. 8: Add the legend "51" to the large block.

These changes are indicated in red ink on the enclosed photocopies; and are

necessary for proper conformance to the written description. The changes are identical to those

made in the parent of this application.

Respectfully submitted,
FROMMER LAWRENCE & HAUG LLP

By: _____

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FIG. 6

1394 LINK LSI
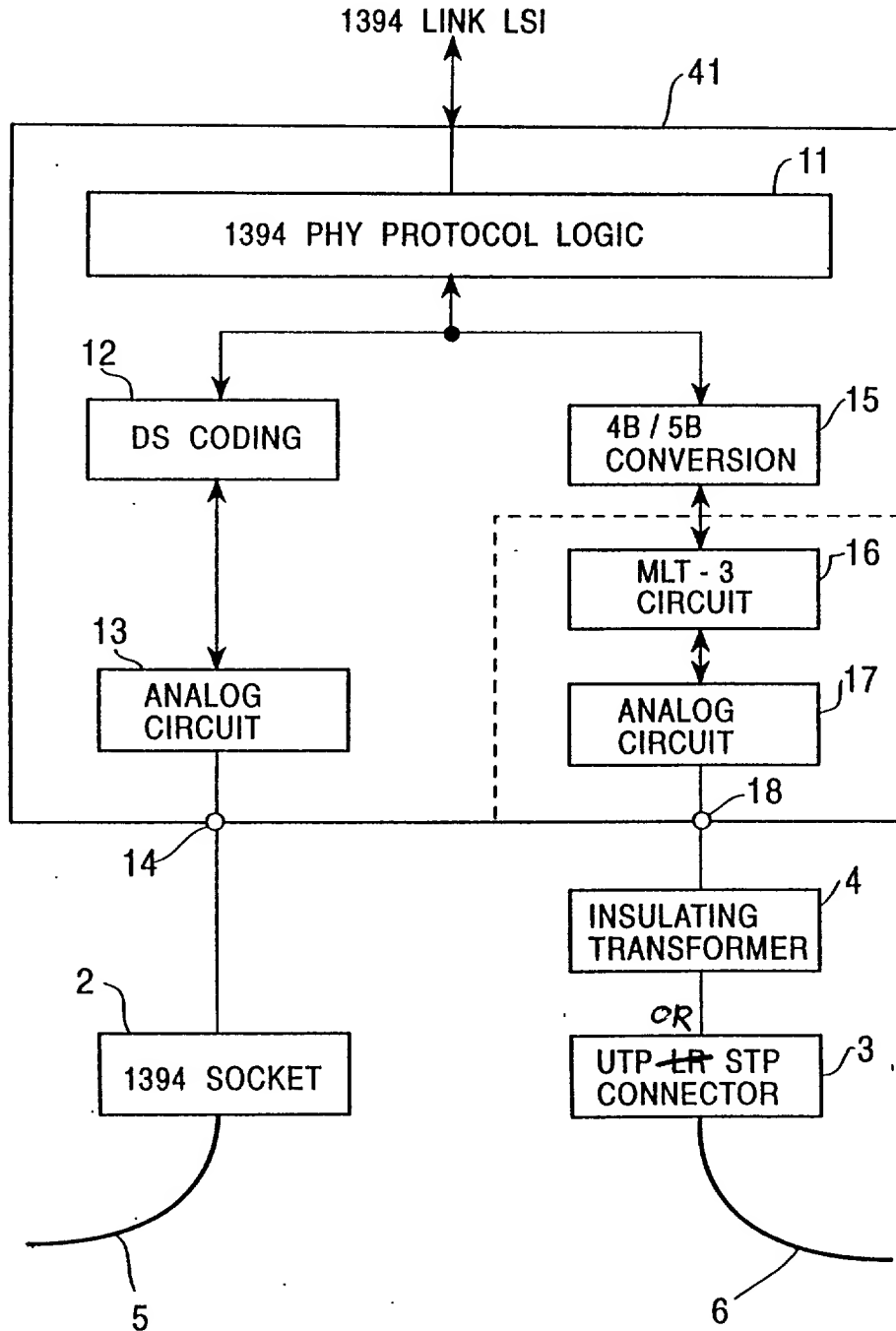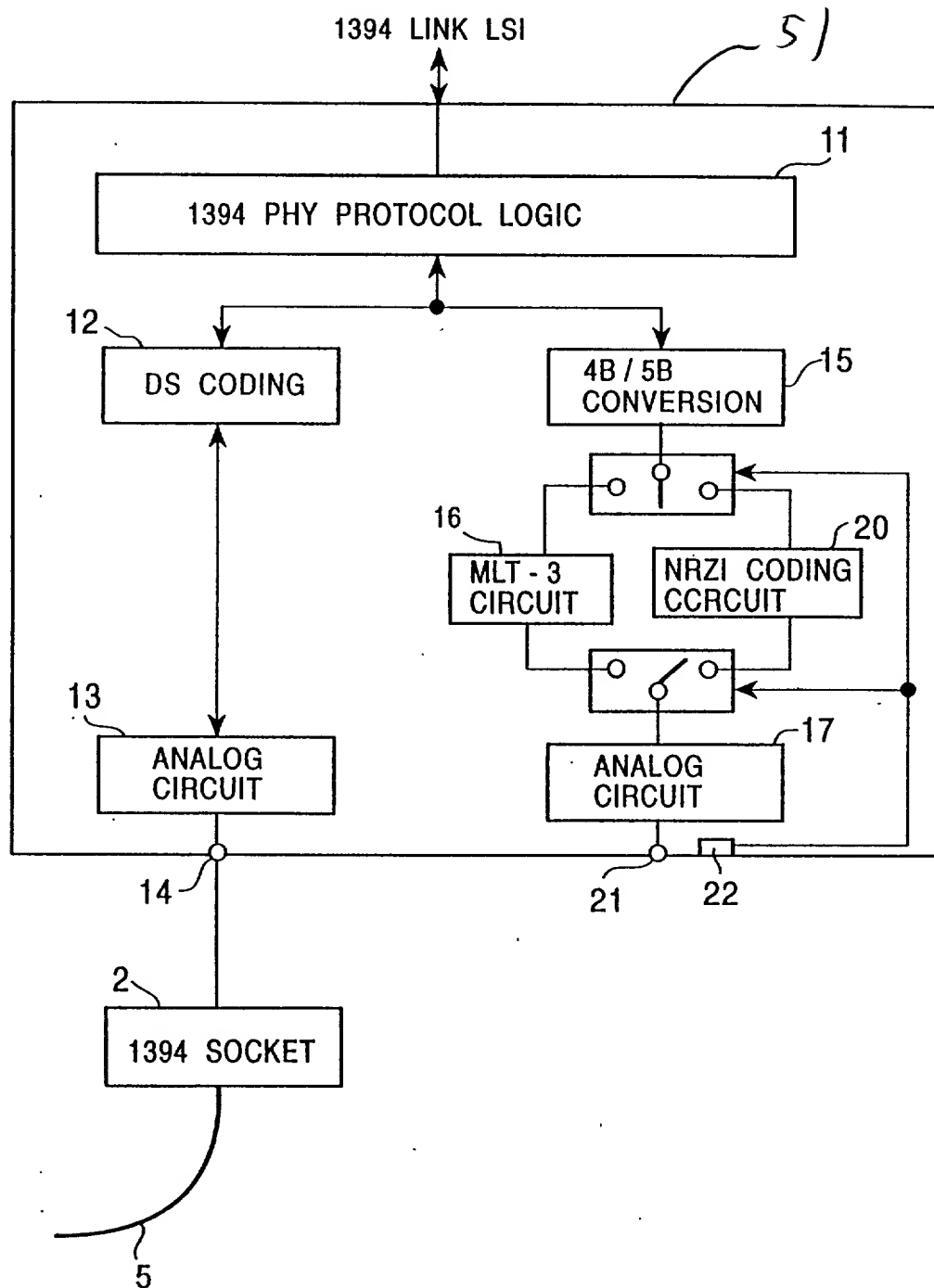
41

| 1394 PHY PROTOCOL LOGIC | 11 |

12

DS CODING

15
4B / 5B CONVERSION

16
MLT - 3 CIRCUIT

13
ANALOG CIRCUIT

17
ANALOG CIRCUIT

14

18

2
1394 SOCKET

4
INSULATING TRANSFORMER

OR

3
UTP ~~LR~~ STP CONNECTOR

5

6

FIG. 8

1394 LINK LSI

5)

11
1394 PHY PROTOCOL LOGIC

12
DS CODING

15
4B / 5B
CONVERSION

16
MLT - 3
CIRCUIT

20
NRZI CODING
CCRCUIT

13
ANALOG
CIRCUIT

17
ANALOG
CIRCUIT

14

21   22

2
1394 SOCKET

5